REMARKS

The office action of August 10, 2005 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 1 through 10 remain in this case.

Claim 1 was amended to clarify the subject matter being claimed and increase the consistency throughout the claim, specifically changing "outer" to "outside." The amendments to claim 1 are supported in the originally filed application on pages 4-5, lines 28-4; page 6, lines 23-25; page 7, lines 1-12; page 7-8, lines 29-7; page 8, lines 16-17, 22-27; and page 9, lines 8-16. No new matter has been entered.

Exhibits A and B are enclosed with this response. Please note that the total number of pages of the Exhibits is 4.

The numbered paragraphs below correspond to the numbered paragraphs in the Office Action.

Rejection(s) under 35 U.S.C. §112

3. Claims 5-6, and 8 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claims 5, 6, and 8 were amended to clarify the subject matter being claimed by removing the word "type". No new matter has been entered.

Applicant believes that these amendments have fully addressed the Examiner's rejections, and the claims are now in condition for allowance. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection(s) under 35 U.S.C. §103

5. Claims 1-2 and 4-8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791).

Applicant respectfully disagrees.

Amended claim 1 requires, in part,

a plurality of cylindrical bushings having an outer surface and an outside diameter, and an open center having an inside surface and an inside diameter, the bushings passing through the apertures of the first links and the second links; and

...

the diameter of the apertures of the first links and the outside diameter of the bushings being tightly fit **such that no relative movement occurs between the inner surface of the apertures and the outer surface of the bushings**;

the diameter of the apertures of the second links being larger than the diameter of the apertures of the first links, **and having a bearing area for contact between the outer surface of the bushing and the inner surface of the apertures, such that the outer surface of the bushing can move relative to the inside surface of the apertures of the second links and carries chain load**;

The base reference, Avramidis, does not have cylindrical bushings. Avramidis' chain has a plurality of links in which the apertures each receive a front segmental bushing and a rear segmental bushing. The segmental bushings are independent of each other and move relative to each other. The segmental bushings are, at most, partial arcs, and do not form cylinders.

Bremer has no bushings of any kind, nor does Bremer even have cylindrical pins. Bremer has semi-cylindrical pins which rock in non-circular apertures.

Therefore, the combination of Avramidis and Bremer cannot teach cylindrical bushings. At most, the combination of Avramidis and Bremer would give a chain with semi-circular pins rocking in segmented bushings. This is completely outside the requirements of the claims in the current application.

The claims, however, go beyond simply requiring cylindrical bushings - they require cylindrical bushings which fit without relative movement to the first links, and with movement to the second links, and carry bearing load through the outside surface of the bushing. Even if the segmented bushings in Avramidis were to be considered "cylindrical" (a point Applicant does

not believe is true), the segmented bushings fit into all of Avramidis' links the same way. See col. 2, lines 33-35 - "a second set S-2 of links consists of aligned, laterally spaced-apart links 24, *identical to the links of set S-1.*" Furthermore, Applicant's second links have a "bearing area for contact between the **outer surface of the bushing** and the inner surface of the apertures," which is shown in greater detail in the attached Exhibit (emphasis added).

Applicant's cylindrical bushings have **both** an inner surface and an outer surface that act as bearing surfaces, a function which is impossible in Avramidis' segmented bushings (or Bremer's lack of bushings). Exhibit A shows Figures 2 and 3 of Avramidis in comparison to Figure 8 of the Applicant's present application. Red arrows are each labeled with numbers, and the force moves through the numbers in numerical order, with the sequence repeating.

In Avramidis, "Force is transmitted from one pin to a segmental bushing secured rigidly in a pocket in one of the openings of the set of links. From the bushing the pockets, the force is transmitted through the set of links to the other bushing tightly secured in the pockets of the other openings in said set of links from this bushing, the force is transmitted directly to the pin" column 3, lines 38-44 (emphasis added). Referring to Exhibit A, Figures 2 and 3 of Avramidis, this can be seen diagrammatically: a force on the chain causes the load in the pin in link S-3 to move to the right in Figure 2. The load in the pin moves to a static bushing (arrow 1) that does not move relative to link S-3. From the static bushing, the load moves to the body of link S-3 (arrow 2). The load then moves through link S-3 to bushing FSB-3 (arrow 3). From the bushing FSB-3, the load moves to the pin (arrow 4), in which there is a bearing interaction. From the pin, the load moves to the inner surface of the bushing RSB-1 (arrow 5) which has a bearing interaction with the pin and can slide relative to the pin. From bushing RSB-1, the load moves to the body of link S-1 (arrow 6). The load then moves through the body of the link S-1 to static bushing FSB-1 (arrow 7). From the static bushing FSB-1, the load moves to the pin (arrow 8). Arrow 8 is showing the load moving from the bushing to the pin and can more clearly be seen in Figure 3 of Avramidis, which is also part of Exhibit A.

As discussed above, the only interaction between elements that slide or act as a bearing surface is between the inside surface of the bushings and the pin. A sliding interaction or a bearing surface is not present on the outside surface of the bushings. Furthermore, force or load

is present on both sides of the bushings and the pins. Each link in Avramidis has the same load path as shown above.

Figure 8 of Exhibit A shows a chain of Applicant's present invention. In Applicant's invention, the load is carried in two paths simultaneously, which are parallel to each other. Starting with load or tension in link 32, the load moves from link 32 to the outer diameter of bushing (arrow A1), which is press fit into the apertures of link 32. There is a static interface between the outer diameter of the bushing and link 32. The load then moves from the inner diameter of the bushing to the pin 30, in which there is a bearing interface (arrow A2). From the surface of the pin 30, the load moves to the outer link 22 (arrow A3). The pin 30 and the outer link 22 have a static interface. The load moves through the body of the link 22 to the other pin 30 (arrow A4). From the pin 30, the load moves to the inner diameter of the bushing in which there is a bearing interface (arrow A5). The load then moves from the outer diameter of the bushing to link 32 (arrow A6). There is a static interface between the outer diameter of the bushing and link 32.

At the same time, load is also carried along a second, parallel path. Starting with load or tension in link 32, the load moves from link 32 to the outer diameter of the bushing. A static interface is present between the link 32 and the outer diameter of the bushing (arrow B1). From the outer diameter of the bushing, the load moves to the aperture of the second set of links 34 (arrow B2), in which there is a bearing interface. The load then moves through the body of link 34 to the bearing interface between the link 34 and the outer diameter of the bushing (arrow B3). From the outer diameter of the bushing, the load moves to link 32 (arrow B4). The interface between the outer diameter of the bushing and the link 32 is static.

Therefore, the tensile load in Applicant's chain is transferred along two parallel paths with two different moveable bearing surfaces. Again, the first bearing surface is between the pin and the inner diameter of the bushing of the first set of links, and a second bearing surface is between the outer diameter bushing and the second set of links as required by Applicant's amended claim 1.

Neither Avramidis nor Bremer teach or suggest two bearing surfaces and/or two parallel paths for transferring tensile load through the chain and the use of the outside surface of the cylindrical bushings as bearing surfaces.

Therefore, it is respectfully suggested that the rejection of independent claim 1 as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) is overcome. Dependent claims 2 and 4-8, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

6. Claim 3 was rejected under 35 U.S.C. 103(a) as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) as applied to claim 1, and further in view of Belcher et al. (USPN 1,956,942).

Applicant respectfully disagrees and believes the claims are patentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) as applied to claim 1 and further in view of Belcher et al. (USPN 1,956,942) individually and in combination. The arguments as to the nonobviousness of claim 1 is repeated here by reference.

Belcher et al. does not have any bushings or cylindrical pins. Instead, Belcher et al. has a hollow rivet which acts simply as a pin would in a conventional silent chain. Regarding claim 1, as discussed above, upon which claim 3 depends, the combination of Avramidis in view of Bremer does not teach or suggest, nor does Belcher et al. teach what Avramidis in view of Bremer lacks. More specifically, Avramidis in view of Bremer as applied to claim 1 and further view of Belcher et al. does not teach or disclose from claim 1 in part:

a plurality of cylindrical bushings having an outer surface and an outside diameter, and an open center having an inside surface and an inside diameter, the bushings passing through the apertures of the first links and the second links; and

a plurality of cylindrical pins having an outer surface and an outer diameter, passing through the apertures of the outer links and through the open center of the bushings, and having a bearing area for contact between the outer surface of the pin and the inner surface of the bushing, **such that the outer surface of the pin**

can move relative to the inner surface of the bushing and carries load from the bushing;

...

the diameter of the apertures of the first links and the outside diameter of the bushings being tightly fit **such that no relative movement occurs between the inner surface of the apertures and the outer surface of the bushings;**

the diameter of the apertures of the second links being larger than the diameter of the apertures of the first links, **and having a bearing area for contact between the outer surface of the bushing and the inner surface of the apertures, such that the outer surface of the bushing can move relative to the inside surface of the apertures of the second links and carries chain load;...**

Therefore, it is respectfully suggested that the rejection of claim 3, dependent on independent on claim 1 as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) as applied to claim 1 and further in view of Belcher et al. (USPN 1,956,942) is overcome. Dependent claim 3, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

7. Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) as applied to claim 1, and further in view of Mott (USPN 5,176,587).

Applicant respectfully disagrees and believes the claims are patentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) as applied to claim 1 and further in view of Mott (USPN 5,176,587) individually and in combination. The arguments as to the nonobviousness of claim 1 is repeated here by reference.

Mott discloses bushings that are non-cylindrical. Regarding claim 1, as discussed above, upon which claim 9 depends, the combination of Avramidis in view of Bremer does not teach or

suggest, nor does Mott teach what Avramidis in view of Bremer lacks. More specifically, Avramidis in view of Bremer as applied to claim 1 and further view of Bremer does not teach or disclose from claim 1 in part:

> **a plurality of cylindrical bushings** having an outer surface and an outside diameter, and an open center having an inside surface and an inside diameter, the bushings passing through the apertures of the first links and the second links; and
>
> **a plurality of cylindrical pins** having an outer surface and an outer diameter, passing through the apertures of the outer links and through the open center of the bushings, and having a bearing area for contact between the outer surface of the pin and the inner surface of the bushing**, such that the outer surface of the pin can move relative to the inner surface of the bushing and carries load from the bushing;**
>
> ...
>
> the diameter of the apertures of the first links and the outside diameter of the bushings being tightly fit **such that no relative movement occurs between the inner surface of the apertures and the outer surface of the bushings**;
>
> the diameter of the apertures of the second links being larger than the diameter of the apertures of the first links, **and having a bearing area for contact between the outer surface of the bushing and the inner surface of the apertures, such that the outer surface of the bushing can move relative to the inside surface of the apertures of the second links and carries chain load;...**

Therefore, it is respectfully suggested that the rejection of claim 9, dependent on independent on claim 1 as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) as applied to claim 1 and further in view of Mott (USPN 5,176,587) is overcome. Dependent claim 9, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

8. Claim 10 was rejected under 35 U.S.C. 103(a) as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) and Mott (USPN 5,176,587).

Applicant respectfully disagrees. Claim 10 requires, in part,

> **a plurality of cylindrical bushings** having an outer surface and an outside diameter, and an open center having an inside surface and an inside diameter, the bushings passing through the apertures of at least some of the links; and
>
> **a plurality of cylindrical pins** having an outer surface and an outer diameter, passing through the apertures of the links and through the open center of the bushings, the outer diameter of the pins being less than the inside diameter of the bushings, such that the pins may move within the open center of the bushings;
>
> . . .
>
> such that the outside surface of the pins bear and articulate against the inside surface of the bushings, and the inside surface of the apertures in the links through which the bushings pass bear and articulate against the outer surface of the bushings, **the use of both inside surface and outside surface of the bushings to carry load in a plane of the links allowing increased bearing area for a given chain width**.

The base reference, Avramidis, does not have cylindrical bushings. Avramidis' chain has a plurality of links in which the apertures each receive a front segmental bushing and a rear segmental bushing. The segmental bushings are independent of each other and move relative to each other. The segmental bushings are, at most, partial arcs, and do not form cylinders.

Bremer has no bushings of any kind, nor does Bremer even have cylindrical pins. Bremer has semi-cylindrical pins which rock in non-circular apertures.

Mott discloses bushings that are non-cylindrical.

Therefore, the combination of Avramidis and Bremer and further in view of Mott cannot teach cylindrical bushings. At most, the combination of Avramidis and Bremer would give a

chain with semi-circular pins rocking in segmented or non-circular bushings. This is completely outside the requirements of the claims in the current application.

The claims, however, go beyond simply requiring cylindrical bushings – they require that the cylindrical pins bear and articulate against the inside surface of the cylindrical bushings, and the inside surface of the apertures in the links, through which the bushings pass, bear and articulate against the outer surface of the bushings, <u>the use of both inside surface and outside surface of the bushings to carry load in a plane of the links allowing increased bearing area for a given chain width</u> (emphasis added).

Furthermore, the second links have a "<u>bearing area for contact between the **outer surface of the bushing** and the inner surface of the apertures,</u>" which is shown in greater detail in the attached Exhibit (emphasis added).

Applicant's cylindrical bushings have **both** an inner surface and an outer surface that act as bearing surfaces, a function which is impossible in Avramidis' segmented bushings (or Bremer's lack of bushings). Exhibit A shows Figures 2 and 3 of Avramidis in comparison to Figure 8 of the Applicant's present application. Exhibit B shows Figure 4 of Mott. Red arrows are each labeled with numbers, and the force moves through the numbers in numerical order, with the sequence repeating.

In Avramidis, "<u>Force is transmitted from one pin to a segmental bushing secured rigidly in a pocket in one of the openings of the set of links. From the bushing the pockets, the force is transmitted through the set of links to the other bushing tightly secured in the pockets of the other openings in said set of links from this bushing, the force is transmitted directly to the pin</u>" column 3, lines 38-44 (emphasis added). Referring to Exhibit A, Figures 2 and 3 of Avramidis, this can be seen diagrammatically: a force on the chain causes the load in the pin in link S-3 to move to the right in Figure 2. The load in the pin moves to a static bushing (arrow 1) that does not move relative to the link S-3. From the static bushing, the load moves to the body of link S-3 (arrow 2). The load then moves through link S-3 to bushing FSB-3 (arrow 3). From the bushing FSB-3, the load moves to the pin (arrow 4), which is a bearing interaction. From the pin, the load moves to the inner surface of the bushing RSB-1 (arrow 5) which has a bearing interaction with the pin and can slide relative to the pin. From bushing RSB-1, the load moves to the body

of link S-1 (arrow 6). The load then moves through the body of the link S-1 to static bushing FSB-1 (arrow 7). From the static bushing FSB-1, the load moves to the pin (arrow 8). Arrow 8 shows the load moving from the bushing to the pin and can more clearly be seen in Figure 3 of Avramidis, which is also part of Exhibit A.

As discussed above, the only interaction between elements that slide or act as a bearing surface is between the inside surface of the bushings and the pin. A sliding interaction or a bearing surface is not present on the outside surface of the bushings. Each link in Avramidis has the same load path as shown above.

Exhibit B shows Figure 4 of Mott. Starting with tension or load pulling to the right in the figure, load moves from the pin 60 to the inner surface of the bushing 76 by a rocking interface or motion (arrow 1). From the bushing 76, the load moves to link "A" (arbitrarily assigned) through a static interface (arrow 2). The load then moves through the body of link "A" to the other bushing through a static interface (arrow 3). From the bushing, the load transfers to the pin via a rocking interface (arrow 4). The roller was not included because it does not transmit any tension or load of the chain and is only present to cushion the sprocket.

Figure 8 of Exhibit A shows a chain of Applicant's present invention. In Applicant's invention, the load is carried in two paths simultaneously, which are parallel to each other. Starting with load or tension in link 32, the load moves from link 32 to the outer diameter of bushing (arrow A1) which is press fit into the apertures of link 32. There is a static interface between the outer diameter of the bushing and link 32. The load then moves from the inner diameter of the bushing to the pin 30, in which there is a bearing interface (arrow A2). From the surface of the pin 30, the load moves to the outer link 22 (arrow A3). The pin 30 and the outer link 22 have a static interface. The load moves through the body of the link 22 to the other pin 30 (arrow A4). From the pin 30, the load moves to the inner diameter of the bushing in which there is a bearing interface (arrow A5). The load then moves from the outer diameter of the bushing to link 32 (arrow A6). There is a static interface between the outer diameter of the bushing and link 32.

At the same time, load is also carried along a second, parallel path. Starting with load or tension in link 32, the load moves from link 32 to the outer diameter of the bushing. A static

interface is present between the link 32 and the outer diameter of the bushing (arrow B1). From the outer diameter of the bushing, the load moves to the aperture of the second set of links 34 (arrow B2), in which there is a bearing interface. The load then moves through the body of link 34 to the bearing interface between the link 34 and the outer diameter of the bushing (arrow B3). From the outer diameter of the bushing, the load moves to link 32 (arrow B4). The interface between the outer diameter of the bushing and the link 32 is static.

Therefore, the tensile load in Applicant's chain is transferred along two parallel paths with two different moveable bearing surfaces. Again, the first bearing surface is between the pin and the inner diameter of the bushing of the first set of links, and a second bearing surface is between the outer diameter bushing and the second set of links as required by Applicant's amended claim 1.

Neither Avramidis nor Mott teach or suggest two bearing surfaces and/or two parallel paths for transferring tensile load through the chain, or the use of the outside surface of the cylindrical bushings as bearing surfaces.

Therefore, it is respectfully suggested that the rejection of independent claim 10 as being unpatentable over Avramidis (USPN 3,661,025) in view of Bremer (USPN 2,667,791) and further in view of Mott (USPN 5,176,587) is overcome. Reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with Applicants' attorney would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

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By:____________________________________

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EXHIBIT A

U.S. Serial No. 10/650, 539

Fig. 8

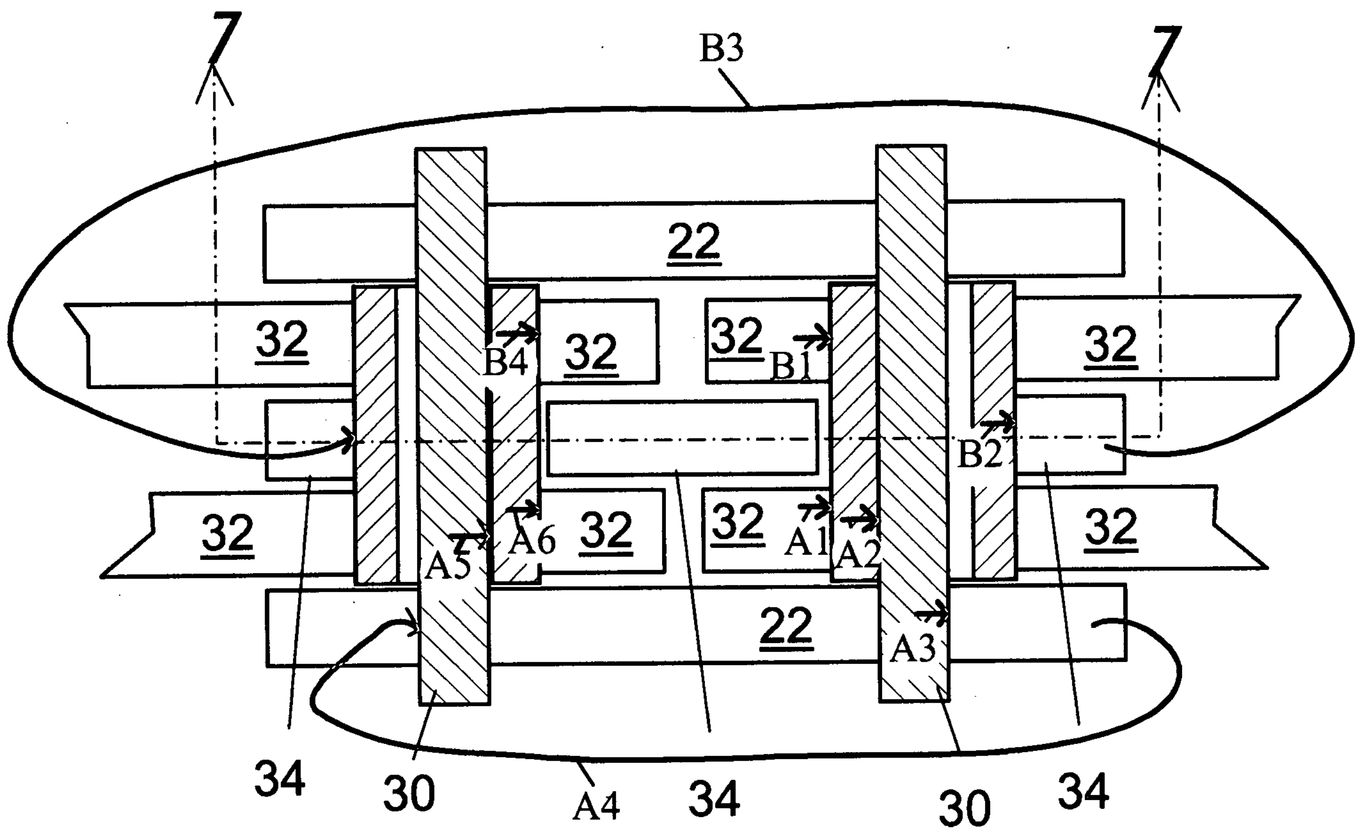

Exhibit A cont'd

U.S. Patent No. 3,661,025 Avramidis

FIG_2

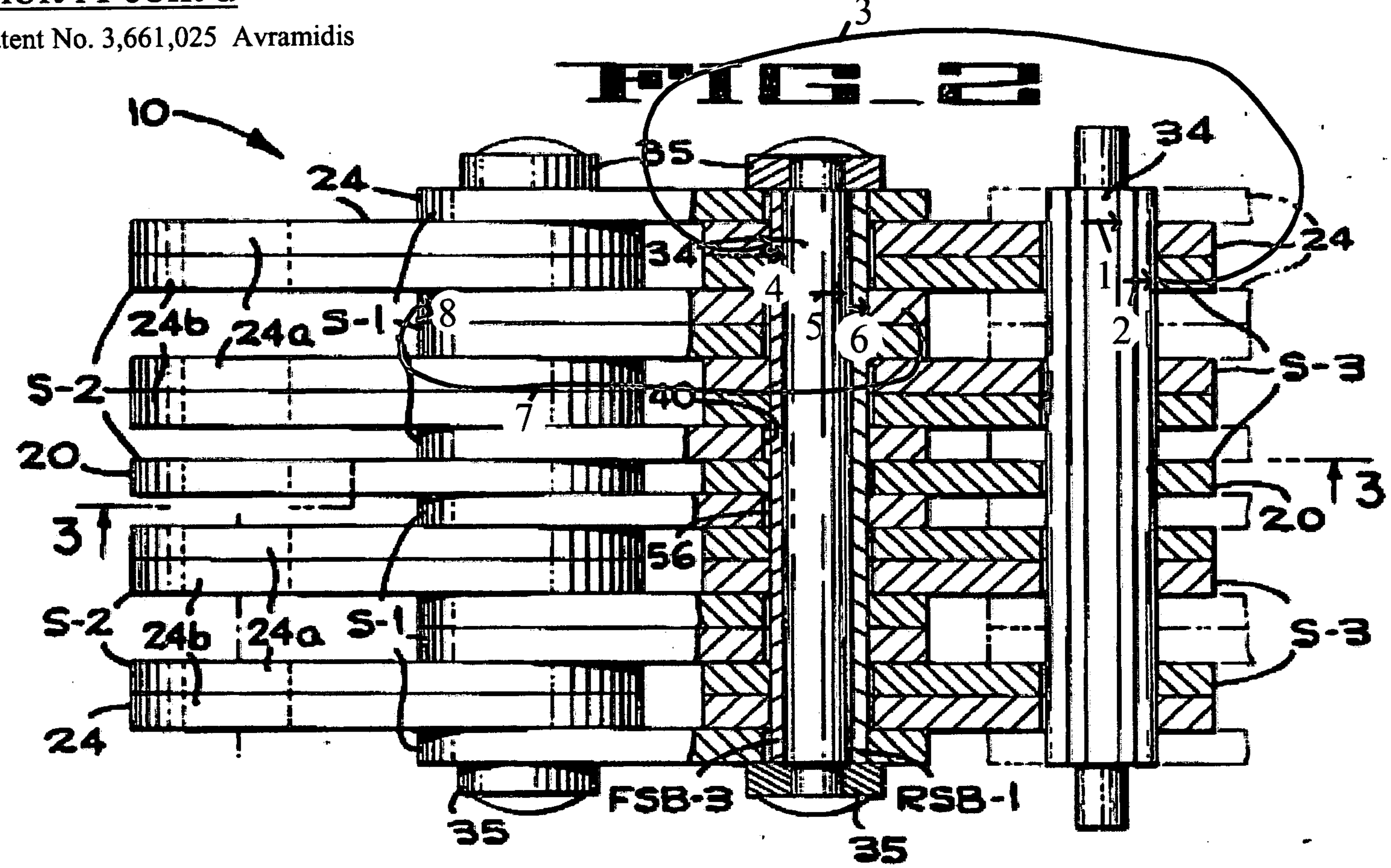

EXHIBIT A cont'd

U.S. Patent No. 3,661,025 Avramidis

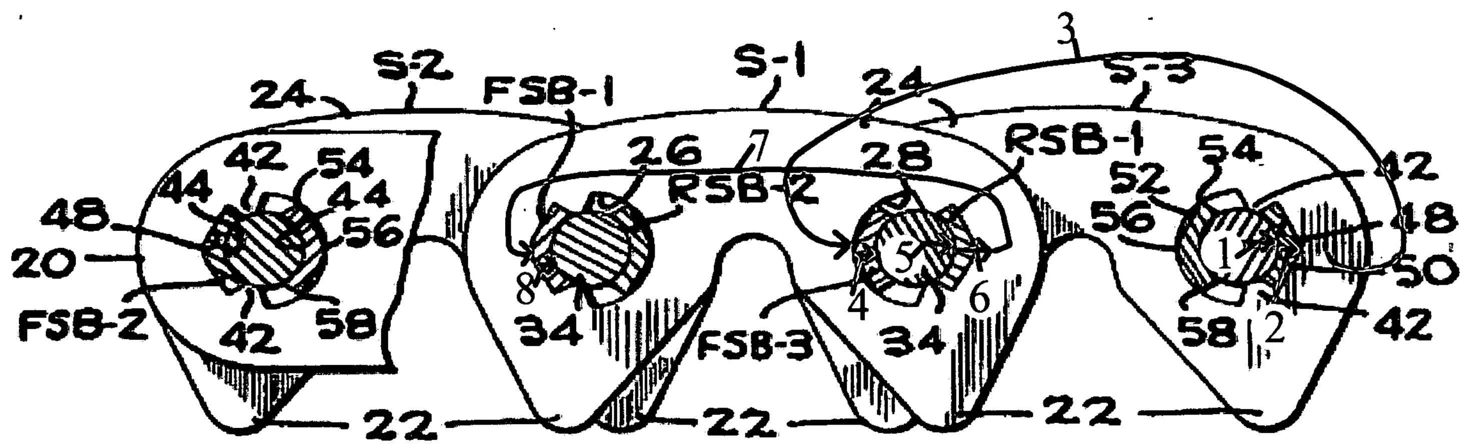

FIG. 3

EXHIBIT B

U.S. Patent No. 5,176,587 Mott

Fig. 4